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Published on SBIR.gov (https://www.sbir.gov)

**1.** N152-091: Advanced Non-Destructive System to Characterize Subsurface Residual Stresses in Turbo-machinery Components

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Compressive surface treatments are frequently used in turbo-machine components to add a factor of safety to their component life. The residual stress (RS) profile that is imparted to metallic components can vary by application, service use, time, and environment. The US Navy is interested in non-destructively measuring the subsurface residual stress field in metallic engine components, specificall ...

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2. N152-092: Inducing Known, Controlled Flaws in Electron Beam Wire Fed Additive Manufactured Material for the Purpose of Creating Non-Destructive Inspection Standards

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Several military platforms are targeting EBAM for production of new, replacement, and repair components. Standard NDI methods are currently being applied to EBAM components, but significant capability gaps exist in inspections of component preforms thicker than approximately 3". Uncertainty remains around the probability of detection, minimum detectable flaw size, and resolution of non-destructive ...

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**3.** N152-093: Innovative, High-Energy, High Power, Light-Weight Battery Storage Systems Based on Li-air, Li-sulfur (Li-S) Chemistries

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

As the Navy modernizes its Fleet, the energy needs of naval aircraft are increasing significantly. Meeting the energy demands of these aircraft is a formidable challenge which requires looking beyond current Lithium-ion (Li-ion) batteries. The state-of-the-art Li-ion cells have a theoretical specific energy of 387 Wh/kg (watt hour/kilogram) and energy density of about 1015 Wh/L (volumetric energy ...

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**4.** N152-094: Model-Based Tool for the Automatic Validation of Rotorcraft Regime Recognition Algorithms

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Due to practical, technical, and logistical limitations associated with achieving direct loads monitoring for every fatigue sensitive component on an aircraft, the Navy is relying on flight maneuver recognition to provide usage data across a fleet of aircraft in order to refine fatigue life calculations. However, current RR tools have trouble accurately and precisely recognizing flight regimes. Th ...

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# **5.** N152-095: Ultra-High Temperature (UHT) Sensor Technology for Application in the Austere Environment of Gas Turbine Engines

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Current blade health monitoring sensors are capable of operating at  $1100^{\circ}F$  continuously uncooled, and have been demonstrated to work up to  $1800^{\circ}F$  with cooling. Use of compressor air for sensor cooling would adversely impact the cycle efficiency and potentially produce case distortion, and hence, a need exists to develop uncooled sensors that can operate in a  $+2500^{\circ}F$  environment in the aft end o ...

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# **6.** N152-096: Miniaturized, Fault Tolerant Decentralized Mission Processing Architecture for Next Generation Rotorcraft Avionics Environment

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Most avionics systems for rotorcraft currently rely on a federated mission computer/processing architecture which centralizes the aggregation of data for processing and subsequent Human Machine Interface (HMI)/subsystem transmission. Current Rotocraft Federated architecture habitually claims redundancy by having a secondary processing computer that is either fully capable, or has a reduced situati ...

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#### 7. N152-097: Low Emissions Waste to Energy Disposal

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Island bases and other remote forward operating bases (FOB) have limited land and energy resources to dispose of municipal solid waste (MSW). Open air pits are discouraged and congressionally required to be nearly-eliminated. Due to the high volume of generated MSW and limited amount of real-estate, landfills and bio-digestive approaches are impractical. Incinerators currently being used require e ...

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### 8. N152-098: Modular Smart Micro/Nano-Grid Power Management System

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Microgrids are being considered at DoD installations to better manage energy usage, with the objective of providing better efficiency, reliability, and higher integration of renewable generation such as wind and solar. While the benefits of microgrids are broadly touted, implementation has been slow and complex. A turnkey modular micro/nano-grid controller

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design is sought, that would expedite tes ...

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### 9. N152-099: Cooled BusWork for Shipboard Distribution and Energy Storage

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

Improvements in the manufacturing of power density, power quality, and efficiency in power and energy management and control are needed by the Navy to meet power and energy demands and allow for future mission growth. The Navy is seeking to foster the development of common, affordable electrical components and systems that could have broad application to ships. Electrochemical storage (battery) ce ...

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## 10. N152-100: Navy Air Cushion Vehicles (ACVs) Lift Fan Impeller Optimization

Release Date: 04-24-2015Open Date: 05-22-2015Due Date: 06-24-2015Close Date: 06-24-2015

The Ship-to-Shore Connector (SSC), a replacement hovercraft for the existing fleet of Landing Craft, Air Cushion (LCAC) vehicles, utilizes a lift fan system to discharge air into the craft's skirt and bow thrusters to lift the hovercraft under normal operation. Each SSC utilizes two identical lift fans which are defined by an impeller and a volute assembly. Each lift fan impeller includes a cent ...

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